# MAN AND THE GLACIAL PERIOD

BY

W J McGEE

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[From the American Anthropologist for January, 1893]

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## I.

Wheresoever workers assemble, there idlers gather to feast on the fruits of honest toil; a part are pitiable paupers, some traffic in unwholesome wares, others swindle the unwary under the cloak of honest dealing and cheat justice by specious pleas, and still others steal and rob. Thus the laborer is always the prey of the idler, and progressive mankind is handicapped by the burden of the helpless and the perverse.

In like manner the workshops and market-places of science are haunted by harpies; a part are the feeble of mind who always absorb but never produce, some starve and poison hungry minds with the husks of fiction and the lotus of myth, others foist falsehood on the unwary under the guise of science and hide from justice behind shields of skillfully-woven words, and still others scoff at reason and rob knowledge of its glory. Thus creative genius is the prey of intellectual parasites, and the progress of knowledge is hindered by the helpless and the perverse.

Anthropology is the youngest of the sciences, and even yet is barely crystallized out of the original magma of unsystemic thought; moreover, anthropology is the most complex and obscure among the subjects of knowledge, so that its field gives but treacherous ground even for the cautious student. Yet the science of man is peculiarly attractive to human kind, and for this reason the untrained are constantly venturing upon its purlieus; and since each heedless adventurer leads a rabble of followers, it behooves those who have at heart the good of the science not only to guard carefully their own footsteps, but to bell the blind leaders of the blind. The blind leaders are sometimes comparatively innocent traffickers in the imaginary, like unto the sellers of poison drinks, and sometimes the less pardonable deceivers of the unwary and defeaters of justice, like unto commercial swindlers; while the blind led are the dupes of the one and the victims of the other.

No question in anthropology is more enticing than that of human antiquity, and there is much writing on the subject—some good, more bad. In the latter class fall two recent publications, which have much in common. The first of these is Doughty's "Evidences of Man in the Drift;"[1] the second is Wright's "Man and the Glacial Period."[2] Both works profess to treat of the geologic antiquity of man, though neither author can be classed as geologist or anthropologist. The former is a numismatist, a member of the American Numismatic and Archæological Society, and makes no pretense of geologic skill or repute; the latter is a professor of theology in a theologic seminary, yet lays claim withal to geologic skill, which serves to render his writing the more specious.

II.

Mr. Doughty appears to have made a large collection of ice-wrought and water-worn pebbles and ferruginous nodules from the glacial drift, and to have found in their varied and curious forms suggestions of elaborate art. The ferruginous nodules are his most precious relics, abounding as they do in the fantastic forms of clay cemented by iron oxides. "To geologists these tablets are known as a variety of clay stones" (page 13); but to Mr. Doughty they are engraved tablets rich in records of the past. "They bear upon their flattened surfaces figures of human and animal forms, sometimes singly represented, but more frequently in groups," of which one "represents a man with Caucasian features sitting in the presence of several highly-colored individuals, who approach him with bowed heads. In each instance, either the seated figure holds a staff bearing the head of a serpent, or the staff is held before or behind him by another. The seated figure almost always wears an

[1] Evidences of Man in the Drift—a description of certain archæological objects recently discovered in Massachusetts, Connecticut, New York, Pennsylvania and New Jersey: read before the American Numismatic and Archæological Society, March 28, 1892; by Francis Worcester Doughty. New York: privately printed, 1892.

[2] The International Scientific Series. Man and the Glacial Period; by G. Frederick Wright, D. D., LL. D., F. G. S. A., professor in Oberlin Theological Seminary, assistant on the United States Geological Survey, author of The Ice Age in North America, Logic of Christian Evidences, etc.; with an Appendix on Tertiary Man, by Prof. Henry W. Haynes (fully illustrated). New York: D. Appleton and Company, 1892.

elaborate feathered crown resembling that worn by the Palenque figures" (page 10). "Having no desire to theorize," Mr. Doughty merely suggests that the scene represents "the ruler of the serpent clan, or totem, receiving homage from * * * subordinate tribes." "Many of these clay tablets are painted, but the arrangement of color, which resembles the Chinese style, is such as to render it very difficult to determine the nature of the scenes depicted." They are also patinated. A perplexing feature, however, is "the want of proper division between the figures," which is ascribed to a fundamental idea of "space economy," and which "to our eye creates hopeless confusion. The large figures are made up of many smaller ones, and the designs are hard to decipher. * * * A foot in one group is liable to serve as a head in another, the arm of one becomes the leg of another," etc. Moreover, "a specimen held one way shows one design, reversed another, turned again, still another, and so on up to four." Most readers will heartily concur in the author's qualified opinion that "it is hard to understand such artistic methods" (page 11). The sculpturing is not external alone: "Many of the tablets contain a layer of clay through the center. * * * This interior layer of clay presents a second face as perfect as the first, and in every case is found worked up with figures or painted;" and "the most perfect depictions of the human form * * * were found upon the inside clay surfaces of some of these stones." Mr. Doughty's active imagination is able to find not only "traces of animal matter" in the tablets, but "parchment or skin dressed in clay;" and upon this scroll "appears an excellent male head, a full figure of a very fat gentleman, and other devices" (page 12). In short, "these tablets appear to be simply the clay books of the men of the drift;" and this interpretation is sustained by a quotation from Job, xix, 23 (page 13).

The pebbles are hardly less significant to Mr. Doughty; many are heads in profile and full face; some bear "Indian figures and feathered head-dresses strongly marked. Others represent faces of a distinctly Caucasian type, and are often heavily bearded. Sometimes the beard is represented as a mere goatee, at others as being blown by the wind, at others still cut square after the Assyrian style." "Other heads have been found of strongly-marked negroid features and cranial shape;" and it is truly remarkable that the Caucasian pebbles are white, the negroid pebbles black and the Indian pebbles brown, and even more remarkable that the Caucasian heads

"wear hats of various recognized patterns" (page 9). Most striking of all is the solitary instance "of a white face with strongly-marked Celtic features, and a heavy red beard and moustache." The author suggestively adds, "I have found no representative of the cow, but of the man-headed bull I have several examples" (page 10). Other "existing animals" are "the dog, horse, sheep, rabbit, black bear, wolf, anthropoid ape, elephant, green adder, parrot and smaller birds, and the dolphin or whale." There are also many prehistoric animal forms, including "an animal of hippopotimus [sic] type, a large web-footed bird somewhat resembling the dodo, and, lastly, a reptile with a long snout and flattened paddle-like tail" (page 10).

Not content with proving the existence of man in the drift by these remarkable carvings, Mr. Doughty ventures to predict that the "Old Man of the Mountain, that gigantic human profile cut on the New Hampshire hills" (an imaginative sketch of which embellishes the work), was carved out "untold ages ago by the men of the drift" (page 15).

It should be added that Mr. Doughty rejects the "well-known glacial theory" and accepts the view of Ignatius Donnelly, that "the drift was suddenly thrown upon the earth either by the contact of our planet with a comet or by some other agency not understood" (page 7).

In brief the book is a bundle of absurdities worthy of notice only because it is representative of the vain imaginings so prevalent among unscientific collectors and because its maleficent influence has been multiplied by favorable press notices.

III.

The Reverend Professor Wright begins with an introductory chapter, in which he discusses the characters of existing glaciers. He says: "A *glacier* is a mass of ice so situated and of such a size as to have motion in itself. * * * Upon ascending a glacier far enough, one reaches a part corresponding to the lake out of which a river often flows. Technically this motionless part is called the *névé*. * * * The *névé* is the reservoir from which the glacier gets both its supply of ice and the impulse which gives it its first movement" (pages 2, 3). Unfortunately the author does not indicate how a moving body can have a motionless part, nor how

it receives both matter and motion from this motionless part. He fails, in short, to indicate what portion, if any, of his statement is true.[1]

The second chapter treats of existing glaciers and the third of glacial motion, and in so far as they are made up of quotations from trustworthy observers are worthy of high confidence. It is to be regretted, however, that the quotations are not more extensive and in some cases better selected—for example, the observations of Sir Wyville Thompson in the antarctic region are ignored. It is to be regretted even more deeply that the author speciously defends his own blundering attempt to measure the rate of ice motion in Muir glacier instead of accepting the excellent series of measurements by Professor H. F. Reid. In 1886 he sought to measure the movement of this magnificent glacier by "observations * * * with a sextant upon pinnacles of ice recognizable from a base-line established upon the shore" (page 47), and obtained a value of 70 feet per day. In 1890 Professor Reid measured the ice flow at the same season by theodolite readings on a line of flags at approximately equidistant points across the glacier, the observations being made from two stations on opposite sides of the stream. Two independent series of readings were made, each covering a period of three or four days; and partly for the reason that they were designed to correct a manifest error, the observations were made with exceptional care. The measurements show that the daily motion ranges from a few inches near the sides to about 7 feet toward the center, the mean being 4 or 5 feet.[2] The reverend professor seeks to impugn this excellent work by specious arguments (page 47), and even falsifies Reid's record by speaking of "ten feet per day in the most rapidly-moving portion observed," while Reid's highest figure is 7.2 feet.

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[1] Our foremost glacialist, Professor T. C. Chamberlin, says of this remarkable exposition: "As a matter of fact, the névé moves like other parts of a glacier, and the signs of such motion are indicated in the cut on the very page before the reader as he follows this astonishing statement. The motion of the névé has been a matter of common knowledge for half a century, and is absolutely beyond question. The comparison with a lake is wholly misleading, and evidently springs from a fundamental misconception of a glacier."—The Dial, vol. xiii, 1892, p. 303.

[2] Nat. Geog. Mag., vol. iv, 1892, page 44.

Chapter IV is devoted to "Signs of past glaciation." These signs are enumerated as (1) scratches upon the rocks; (2) extensive unstratified deposits; (3) transported bowlders; and (4) extensive gravel terraces. The chapter is elementary if not puerile, and is characterized by egregious and misleading egotism. It purports to summarize the work of a large number of geologists in different countries, chiefly in the United States, yet but two American geologists are mentioned, while the first personal pronoun appears in a score of places, sometimes in deceptive connection. Thus he says (page 62): "I have traced this limit of southern bowlders for thousands of miles across the continent, according to the delineation which may be seen in the map in a later chapter;" and again he extols "our map" and depreciates Professor Chamberlin's earlier mapping by comparison; while in fact his map is little more than a reduction of a map published by Chamberlin years before, and the Reverend Professor Wright never followed "across the continent" any of the lines indicated upon it and never made any observations in the entire region which are accepted with confidence by leading American geologists. Moreover, the enumeration and description of "signs of glaciation" is reprehensibly incomplete and archaic. Probably the most trustworthy and certainly the most widely-spread evidence of glacial action is found in topography. The American drift is known to be of glacial origin not only from its similarity to the moraines of living glaciers, but from a distinct surface configuration, entirely different from that produced by water or any other geologic agency except ice; and extensive drift-free areas are characterized by a topography which could not have been produced by running waters, or by any other agency except moving ice. It is the function of geology to interpret these topographic forms through that branch of the science known as "geomorphy," or sometimes as the New Geology; and much of our knowledge concerning the glacial history of the continent has been acquired thereby; but there is nothing in the Reverend Professor Wright's numerous writings to indicate the slightest comprehension of the principles of geomorphy.

In the fifth and sixth chapters "ancient glaciers" are described at dreary length; for the description is a mélange of crude observation, misleading quotation, and deceptive egotism. Within a generation glacial geology has made great strides, and nowhere has the progress of the science been more rapid than in the United

States. One of the results of the brilliant researches by Chamberlin, Winchell, Salisbury, Gilbert, Smock, Leverett, and other geologists is the recognition of a complex glacial history, including two, three, or more distinct ice invasions separated by intervals of mild climate; a history so complex and long-continued that, according to the independent estimates of different geologists, if the postglacial period is represented by unity, then the period which has elapsed since the beginning of glaciation must be represented by two figures. But this conclusion of modern science is not recognized by the Reverend Professor Wright save when he seeks to conceal its evidence, and through a specious combination of quotation and suppression to misrepresent the views of competent geologists. Thus his description is superficial and warped, and his conclusions are worthless or unintelligible. A generation ago the description and conclusions might have passed for science; to-day they rank as charlatanry.

The seventh chapter, "Drainage systems and the glacial period," is a systemless catalogue of a wide variety of interesting but distantly related facts. It is the function, and indeed the end, of science to classify phenomena in such manner as to indicate natural relation; but the arrangement in this chapter, if arrangement there be, is not such as to set forth natural relation, or geologic history, or science, but such as to conceal relation and give a false air of simplicity and unity to glacial history, and thus to contravene modern science. For example, the author refers to Winchell's work on the recession of the fall of St. Anthony at length (pages 209, 210), but in such manner as to suppress Professor Winchell's conclusions as to the bipartition of glacial history; and on later pages (233–237) he quotes Russell and Gilbert on the fossil seas of the Great Basin in such manner as to convey an impression of fairness and completeness, yet in such terms as to conceal their conclusions concerning the bipartition of the lacustral history of this part of the continent.

To the anthropologist the interest of the subject to which the work is nominally devoted centers in the eighth chapter, "Relics of man in the glacial period." The instances in which "the relics of man are directly and indubitably connected with deposits of this particular period east of the Rocky Mountains" (page 254) are (1) the Abbott argillites from the Trenton gravels; (2) the Metz "paleoliths" from Madisonville and Loveland, Ohio; (3) the Cresson "paleolith" from Medora, Indiana; (4) the Mills flint from Newcomerstown, Ohio; and (5) the Winchell-Babbitt quartz chips from

Little Falls, Minnesota. In addition he introduces in evidence (6) the Cresson argillite from Claymont, Delaware; (7) the Calaveras skull and other relics from the Pacific coast, and (8) the Nampa figurine from Idaho, with the implication that the first of these indicates the existence of early glacial or preglacial man and the others preglacial or Tertiary man—the implication being deceptively guarded, however, by indefinite expressions and meaningless cross-references.

Now the first mentioned instance (the Abbott argillites) cannot be accepted by reason of the recent splendid work of Professor Holmes, who has shown, *first*, that the supposed paleoliths are not finished implements, but work-shop rejects or blanks; and, *second*, that there is grave reason for questioning whether the objects are not confined to the modern talus—*i. e.*, whether they occur in the Trenton gravels at all.

The second instance was formerly accepted by archeologists as evidence concerning the distribution of the hypothetic glacial man whose existence was supposed to be proved by the Trenton and Little Falls testimony; but since the occurrences are isolated, since the finder is not a skilled geologist able to discriminate between undisturbed glacial deposits and the talus derived therefrom, and since in one case similar objects occur on the surface above the point at which the "paleolith" was found, the presumption is against the evidence and the "finds" cannot be accepted as proof of the existence of man during the glacial period. The same must be said also of the third and fourth instances; and in connection with the last it is necessary to observe that the indirect personal statements of the Reverend Professor Wright (page 251) are unworthy of confidence partly because they are indirect, partly because his incompetence as a geologist is tested by another of his "instances" (the Nampa figurine).

The fifth instance (that of Little Falls) must be rejected because Professor Holmes, with Professor N. H. Winchell, who first found artificial flakes in the surface sands at this place, has within the year shown by means of excavations and extended surveys that there is no implement-bearing stratum at the locality in question, and that the quartz chips are confined to the talus and to the surface soil and subsoil within reach of the windfall excavations now pitting the surface of the glacial terrace. It is painful to learn that a conscientious observer like the late Miss Babbitt should be at fault in a matter of

so grave import; enough to say that the original discoverer accepts Professor Holmes' conclusions.

The sixth instance (Cresson's Claymont argillite) must be rejected, *first*, on the ground of inherent improbability, because its acceptance would at once multiply human antiquity by 10, 20, or 50; *second*, because of the presumption that the object really occurred in the talus;[1] and third, because of the utter lack of definitely corroborative testimony. It is to be observed that Professor Wright's personal plea concerning this instance is incompetent, irrelevant, and immaterial because his conception of glacial history is without time basis—he fails to recognize the succession of widely-separated episodes of which the glacial period was made up. His expressions, too, are misleading; his declaration that "both Mr. McGee and myself have visited the locality with Dr. Cresson, and there can be no doubt that the implement occurred beneath the Columbia gravel" (pages 258, 259), conveys the idea that the three parties named concurred in the observation and the conclusion, while as a matter of fact no more than two of the trio were ever on the ground at the same time, only one made the original observation, and one at least emphatically repudiates the conclusion that the "implement," if implement it be, occurred underneath the Columbia gravel. The distortion of fact in this declaration smacks of the shyster.

The seventh instance cannot be accepted by any cautious archeologist at the apparent value assigned by the reverend professor. There is, indeed, a large body of testimony concerning the association of human relics in auriferous gravels beneath broad lava sheets on the Pacific coast, but the gravels and lava sheets have not been correlated with the glacial deposits of eastern United States or Europe, and their antiquity, either in years or in terms of geologic chronology, has not been determined.

The eighth instance (the Nampa figurine) is the most satisfactory of all, since it affords a measure of the competence on the Reverend Professor Wright as a geologist and as a reasoner of the important subject of the antiquity of man. It is alleged that in 1889 the figurine, a brittle, baked-clay image as fragile as a clay pipe-stem, was brought up in the sand pump used in connection with a heavy drill in boring an artesian well at Nampa, Idaho, from a depth of 320

[1] The presumption implicitly accepted by Mr. Cresson in a recent publication—Science, vol. xx, 1892, page 304.

feet and beneath a heavy lava sheet. Now, it is a fact that one of the best-known geologists of the world chanced to visit Nampa while the boring was in progress, and the figurine and the pretty fiction were laid before him. He recognized the figurine as a toy such as the neighboring Indians give their children, and laughed at the story; whereupon the owner of the object enjoined secrecy, pleading "Don't give me away; I've fooled a lot of fellows already, and I'd like to fool some more." The geologist in question gave no further thought to the matter, knowing that so transparent a fraud would never deceive even a tyro in geologic science; but when it came to the notice of the Reverend Professor Wright he accepted the fiction and far outstripped the jocular finder by foisting it in the public print as evidence of great human antiquity. It may be added that while the figurine has attracted much attention among archeologists, several (including Professor Holmes) refused to accept it even as prehistoric because of the suggestion of classic models found in its lineaments.

In short, chapter VIII is a tissue of error and misrepresentation; not one of the "indubitable" instances is worthy of credence; and its publication to the world as an exposition of American science is an offense to the nostrils.

Two chapters follow on "The cause of the glacial period" and "The date of the glacial period;" it is enough to say that they are of a piece with the earlier chapters.

The work ends with an appendix on "Tertiary man," by Professor Henry W. Haynes, which, albeit short and from the geologic standpoint superficial, is a silver lining to the cloud.

In brief, the introductory chapter of "Man and the glacial period" is absurdly fallacious; the chapter on existing glaciers is redeemed by quotations, but the chapter on "glacial motion" is damned by error and specious misrepresentation; the chapter on "past glaciation" is crude, unjust, egotistic and a generation behind modern science; the fifth, sixth and seventh chapters contain a large body of information which would be useful if properly arranged, but the arrangement is unscientific, unfair to American geologists, and misleading to readers; the eighth chapter purports to prove that man existed during the glacial period, but the evidence is inconclusive, and only proves, *first*, that the author is incompetent to deal with geologic phenomena, and, *second*, that his conception of geologic history is feeble and hazy; while of the concluding chapters it must

be said, tritely yet truly, that nothing that is true is new, and nothing that is new is true.

It would be charitable to allow the arraignment of the work to end here with the implication that the author in his ready acceptance of untrustworthy evidence and his apparent distortion of the views of geologists is a simple enthusiast, a gull rather than a vulture; but it is due to scientific truth to point out evidently intentional deception on the title page. The imposing list of titles which the author appends to his name conveys the impression that he is a geologist rather than a theologian, which is misleading; that he is a professor of geology, which is not true; and that he is an "assistant on the United States Geological Survey," which is sheer mendacity and theft of reputation. The character of the book is indicated by the many errors and misstatements; the character of the author must be gathered from the inherent evidence of his incompetence, the scores of misleading statements, and the apparently deliberate falsification of facts on his title page.

IV.

The two treatises have much in common; both represent the work of the harpies by which the workshops and market-places of science are haunted; both are misleading and pernicious, and both handicap science and hinder the progress of knowledge. Yet there are differences between them: Doughty's work is confessedly extra-scientific, or infra-scientific, and hence will receive little attention outside of the few ill-trained collectors of fantastic objects into whose hands it may fall; while Wright's work represents a stage of science, albeit a primitive stage, and will thus find more frequent readers and work the greater injury. Again, Doughty's pamphlet is privately printed and thus bears the impress of Gilead, while Wright's book is issued by a reputable house as one of an international scientific series, whereby its maleficence is multiplied. Furthermore, Doughty's conclusions are disproved by their absurdity; but some of Wright's conclusions are not *a priori* absurd, and their falsity can only be shown by geologists and anthropologists, whom it behooves to caution laymen and learners against the man and the book. Doughty is a simple-hearted quack whose bread-pills but tickle the fancy of weakling dupes; Wright is a betinseled charlatan whose potions are poison. Would that science might be well rid of such harpies, especially the latter!

## APPENDIX.

### Man and the Glacial Period.*

A misleading paragraph in Dr. Brinton's otherwise excellent review of a recent publication under the above caption,† in connection with the Reverend Professor Wright's response,‡ seems to demand a further word. Dr. Brinton errs in saying "As a glacialist, the author of this volume stands among the first in the country, and his long study of that remarkable period in the geologic history of our planet invests everything he says about it with uncommon authority."

Within recent years there has grown up a new branch of geologic science, which has been called by its devotees "geomorphic geology," "geomorphology," and still more acceptably "geomorphy," and which is frequently spoken of as the "New Geology." It is the function of geomorphy to read geologic history from earth-forms, as the older geology read history from deposits and their fossils. Beginning a score of years ago with Powell's conception of the "base-level," at which erosion ceases, the primary idea has extended and expanded until now the geologist not only recognizes ancient base-levels in certain topographic forms, but is able to determine from steepness of slopes and other topographic relations the rate at which erosion has proceeded in the past, and thereby the attitude and altitude of the land during earlier ages. This branch of science has been successfully pursued by a number of geologists in this country and a few abroad, and is taught in three or four universities; and it has been found of especial use in the study of glacial deposits. It is, however, a sealed book to Professor Wright; not a syllable in his latest work, or in any other of his many publications, or in his public utterances before scientific societies, suggests that he is aware of the existence of the New Geology.

Within two decades the discriminating genius of Chamberlin and a score of fellow-workers in this country has thrown much light on the events and episodes of the glacial period. Largely through the application of geomorphy, it has been shown that the glacial deposits of northeastern America represent two, three, or more distinct ice invasions, occurring at different epochs in a long period, and that the earliest of these deposits is many times older than the latest—indeed the leading authorities agree that if the post-glacial period be represented by unity, then the entire glacial period must be represented by two figures. This

* Reprinted from *Science*, vol. xx, 1892, p. 217.

† *Science*, vol. xx, 1892, p. 249.

‡ Op. cit., pp. 275–277.

succession of ice deposits and ice invasions is not, indeed, recognized by some of those glacialists whose observations have been confined to regions in which only a single deposit is represented; but with one or two exceptions (including our author's namesake, A. A. Wright, professor of geology at Oberlin) every geologist who has studied the marginal drift holds to the bipartite or tripartite or multipartite character of glacial deposits and glacial history. This succession is not admitted by the Reverend Professor Wright. Accordingly, his ideas concerning early man have no definite time-basis and cannot be discussed intelligently by modern archæologists—it would be as easy to discuss the opinions of an author who confounded not only all the successive dynasties recorded in the monuments and hieroglyphs of Egypt, but also the works of the modern fellahin, or of a genealogist who argued that the families of a dozen successive generations dined together at the same board. As an exposition of the antiquity of man and the glacial theory, "Man and the Glacial Period" is a cry from the tombs of a dead past; it represents the primitive knowledge of a quarter century ago, and might then have been considered authoritative; but its publication to-day is an offense to science.

Professor Wright objects to Dr. Brinton's "flippant treatment" of the Nampa figurine, and insists that a geologist who happened to detect the fraud on the ground should burden scientific literature with some detailed statement. It does not seem to occur to him that the gentleman in question avoided rushing into print simply because the fraud was too transparent to deceive geologists, who alone are competent to deal with questions concerning the geologic antiquity of man. Respectable and cultured g ntlemen seem indeed to have been deceived by this alleged "find,"—but they were not geologists; so, too, respectable and cultured people, including an illustrious naturalist, have been deluded by a Philadelphia adventurer with an alleged motor,—but no physicist was deceived; in like manner, intelligent and honest people have been deluded by a brazen pretender into the belief that the heavens may be frightened into tears by cannonading—but the meteorologists are not deluded; and the circle-squares and perpetual-motion inventors are abroad in the land, yet the mathematicians and the mechanicians are not deceived. And it would be folly for the physicist, the meteorologist, the mathematician, and the mechanician to rush into print and advertise each new fraud, for thereby the press would be flooded and libraries crowded, while fraud would only flourish the more for the advertising. So long as poor human nature remains as it is, the knave and the dupe we shall always have with us; and it is to be regretted that a presumably competent authority in his own specialty of theology should be willing to assume either *rôle* in another line of activity.

The author of the work has indeed visited many existing glaciers, and his observations would be of value to geologists if they could be accepted with confidence. A case in point is his measurement of the rate of flow

in Muir glacier, in which he employed primitive methods and recorded a result so extraordinary as to challenge credulity. Subsequently, the measurement was repeated by Professor Reid by a superior method, with a widely different result which is in harmony with all other observations. Instead of acknowledging his evident blunder, or even passing over the matter in silence, Professor Wright has the assurance to "talk round" the issue (p. 47), and thereby impugns the excellent work of a later observer.

"Man and the Glacial Period" is published by a reputable house as one of an "International Scientific Series," and thereby acquires a respectability to which otherwise it could not aspire. Dr. Brinton has fairly, albeit charitably, shown its weakness from the standpoint of anthropology; other reviewers have shown that it sinks even lower when viewed from the standpoint of geology.* In other ways, too, the title page conveys erroneous impressions as to the profession and standing of the author. Thus, he takes unto himself the title "Assistant on the United States Geological Survey." The facts are, that he was temporarily employed by one of the collaborators of the bureau largely for the purpose of testing his competence as an observer; and that the test resulted unsatisfactorily to the bureau and was brought to an end several years ago.

In brief, the world would be wiser if the book were not written.

W J McGEE.

WASHINGTON, D. C.

* E. g., Professor T. C. Chamberlin in *The Dial*, vol xiii., pp. 303-306, Nov. 16, 1892.